

APPENDIX C

SAMPLING INFORMATION

This section contains the LTS Environmental, Inc. NPDES Monitoring Procedures to assist Operations in the event there is a need for the collection of NPDES samples. Please review the procedures prior to collecting any NPDES samples. Contact Steve Lawry with LTS at (805) 644-4560 if you have any questions relating to NPDES sampling.

Sampling kits with laboratory-provided bottles should be kept on the platforms (primarily Platform Elly for Produced Water discharge). These bottles contain acid preservatives and should be handled only with proper PPE.



LTS Environmental Inc.
OCS NPDES Monitoring Procedures for the Dec. 2004 General NPDES
Permit CAG 280000:

Part I: Requirements for each Individual Discharge

The following is a detailed list of LTS procedures needed to implement the NPDES monitoring program beginning in December 2004. Always call ahead to arrange sample transportation and pick up from the lab listed on the chain of custody. More detailed procedures for preservation, sampling and safety issues are covered in Part II and past correspondences:

I. Drilling Activities (discharge #001) / Including Well Treatment and Completion Fluids (discharge #003):

Drilling representatives are responsible for completing the attached "Monthly Drilling Report" form. Please keep a copy with your NPDES files for any facility engaged in any drilling or well workover activities. Review what is required in this report and become familiar with it before discussing it with any drilling representatives. If drilling is active, perform the following tasks:

- Meet with the "drilling representative" and/or lead operator and confirm that they have a copy of the attached Monthly Field Drilling Report. *(at smaller platforms, the lead operator may be the drilling representative for that facility).*
 - Go over the report with the drilling representative and identify any of their questions and report to me. They should be aware that this form must be completed correctly by month end and reported to the compliance department at the end of each month as long as there is any activities done on the wells that are listed in the Monthly Field Report. They should also attach drilling reports or logs that will help as support their data for any future EPA audits.
 - Drilling will perform their own static sheen tests and pollution checks, and other required monitoring requirements listed in their monthly report.
1. LTS will however intercept an occasional Drilling fluid toxicity sample *(collected by the drilling representative)* during certain periods of drilling fluid discharges. If drilling activities are occurring, meet with the drilling representative. Samples are to be collected in 2-4 qt. (i.e. 1 gallon) wide mouth containers and iced down. Follow all normal sample handling procedures *(refer to your training literature on sample handling procedures if any questions)*. Complete chain-of-custody (c-o-c), preserve the samples and call LTS at (805) 644-4560 for sample transport to ABC Labs in Ventura. Once iced, the samples are good for about 28 days. Instruct ABC Labs to perform an "Acute" SPP Toxicity test using Mysisidopsis bahia (Mysisid shrimp). LTS will instruct the lab to set up their test concentrations above and below the NPDES LC50 limit of 3% by volume (30,000 ppm).
 2. Well Treatment, Completion and Workover Fluids (discharge #003) are separate from actual drilling fluids (muds and cuttings), but since they are part of the well work program, they are included herein. During the period that these types of fluids are discharged separately, *(a grab sample for oil and grease is required)*. Try to schedule during normal NPDES sampling, make a clear note on the chain-of-custody (c-o-c) by listing the well number and type of job

that was performed (i.e. acid job returns from well #B2). In most cases, if the fluids were commingled with produced water, note on the chain that O&G samples were collected during the return of WTCF from the well # being treated or worked on.

II. Produced Water (discharge # 002):

The produced water monitoring is broken into two categories. The first is "Reasonable Potential" (RP). RP consists of **grab** samples taken **monthly** for the first 12 months of the permit for the constituents listed below. This has been completed for Platform Elly. (*refer to the individual platform monitoring schedule below*). The second category is oil and grease (O&G). Oil and grease is to be sampled weekly when discharging to the ocean.

1. Reasonable Potential (RP): Currently completed. No further action necessary unless, there are significant changes in the production system (ie. New wells or Eureka influences), in case RP for produced water may be necessary again. The following is required during the RP monitoring phase of the program. The compounds listed below should be collected at the same time. Please list all constituents on the chain-of-custody and include the required Method Detection Limits (MDL) and test methods listed below: (*refer to the pre-completed c-o-c copy and be sure that all footnotes below are recorded on the c-o-c*)

<u>Parameter:</u>	<u>MDL (ug/l)</u>	<u>EPA Test Method</u>
Ammonia	--	350.3
Arsenic	20	200.7
Cadmium	1	200.7
Copper	30	200.7
Cyanide	30	200.7
Lead	80	200.7
Manganese	50	200.7
Mercury	0.5	200.7
Nickel	80	200.7
Selenium	10	200.7
Silver	2	200.7
Zinc	60	200.7
Benzene	3	602
Benzo (a) Anthracene	10	625
Benzo (a) pyrene	10	625
Chrysene	10	625
Benzo (k) Fluoranthene	10	625
Benzo (b) Fluoranthene	10	625
Dibenzo (a,h) Anthracene	10	625
Hexavalent or Total Chrome	5	200.7
Phenol	100	625
Toluene	3	602
Ethylbenzene	1	602
Naphthalene	10	625
2,4-dimethylphenol	10	625
Undissociated Sulfides (1)	20	376.1
Whole effluent toxicity (2),(3)	--	Chronic Bioassay

- (1) Use a Total Sulfides preserved container, and also collect a sample of produced water for pH, Temperature, and salinity once per discharge or twice per year which ever is less. Record the onsite temperature for the produced water on the c-o-c.
- (2) Chronic Toxicity – test for Red Abalone: Collect a one quart 24 hour composite, with aliquots at 3 hour intervals (no fewer then 8 samples). Instruct ABC lab to set up the following concentrations (as listed in Table MAMT / DMMT concentrations obtained from LTS).
- (3) Annual bioassay toxicity monitoring: On the fourth quarter (from the start date of the permit) collect separate 1 gallon composite samples for Red abalone, Top Smelt and Giant Kelp. Continue the annual toxicity sampling every 5th quarter until all four seasons have been collected (see schedule below). *Note: this was completed in Dec. 2007 and is due again in the spring of 2009. Summer 2010 & Fall 2011.*

Toxicity - Additional Monitoring: As listed in the permit, if a toxicity result exceeds one of the monitoring triggers, additional monitoring will be required. Sampling will be required every 3 weeks for 18 weeks. Additional monitoring notices will be given pending test results each month.

III. NPDES Monitoring Schedule per Platform:

Ellen / Eureka: Record Daily Pollution checks for sheen foam or floating solids in the receiving water near the point of all NPDES discharges. This includes sanitary and domestic, fire water and non-contact cooling water. If Drilling is taking place, receiving water observations are also required as listed above as well as sheen tests prior to muds or cuttings discharges. Samples will also be required for toxicity and barite metals analysis. Contact your HSE Manager to obtain detailed drilling discharge requirements.

Elly: Record Daily Pollution checks for sheen foam or floating solids in the receiving water near the point of all NPDES discharges. This includes sanitary and domestic, fire water and non-contact cooling water. Additionally, if produced water is discharged notify Marina Roberts at (562) 683-3497 or alternatively, LTS at (805) 644-4560 for sampling requirements. In all cases, an oil and grease sample must be collected as well as recording the duration and amount of water discharged (in barrels). Then based on historical data and discharge dates, additional analyses may be required such as organics, inorganics and toxicity. If you can't reach any of the two contacts above, fill one set of the sample containers in the NPDES sample kit in the cut lab (for all constituents listed under RP above) and place samples on ice until it can be determined exactly what constituents will need to be tested for.

Oil and Grease Sampling Procedure:

(NPDES limit: 29 ppm Monthly Average / 42 ppm Daily maximum)

The new permit allows for one single oil and grease (O&G) grab sample as an alternative, instead of the four sample composite, but we would like to still collect the four sample composite. The four samples will be taken at a minimum of 15 minute intervals. If time allows, the intervals may be increased based on the duration of the discharge, but try to collect four samples spaced evenly over the time that the discharge takes place. (ie. If there is a four hour discharge, collect a separate sample ever hour).

- Follow all sampling procedures and PPE issues listed in your safety manual regarding O&G sampling and IR testing (i.e. goggles, gloves, proper ventilation). Bottles are preserved with

hydrochloric acid and extreme caution is recommended. Review MSDS for HCl and do not overfill the container.

- Confirm with Operations that all conditions are safe and the NPDES sample point is in service. Purge sample for one full minute.
- Collect the first sample and run an onsite O&G test on a duplicate sample (and/or turbidity if no O&G monitor).
- Report the result of the field test on the c-o-c and also to the lead Operator.
- Continue to sample the other three O&G samples at a minimum of 15 minute intervals and record the duplicate field test as done on the first sample above.
- Always inform the lead operator of the monitoring progress and the sampling intervals.
- Notify and Submit the samples to Cal.Science (714) 895-5494
- Request O&G by EPA method 1664.
- On the c-o-c, request that only the first sample be analyzed and hold the other three until further notice: (per ESH Manager.). (If the first sample is less than the permit limit, the other three will not need to be analyzed. If it is over the limit, the compliance group will notify the lab to have all remaining samples analyzed to get an actual composite value).
- Also on the c-o-c make note that the analysis is to be rushed (24 hour TAT) and note on the c-o-c that Preliminary and Final results are to be called in to Marina Robertson ((714) 683-3497. Additionally note on the c-o-c to fax a copy of the results to the platform supervisor. A rush will be given to the other three samples should they need to be analyzed.
- On the c-o-c request the Report go to Marina Robertson with copies the Platform Supervisor.

Chain-of-Custody: LTS has prepared generic chains to be used for all of the above sampling and are filed with the NPDES Manual. Due to the complexity of the sampling program, please make copies and keep them with you at all times. Use these forms during your NPDES monitoring and call LTS to identify what needs to be analyzed.

- One sample per quarter shall be analyzed for zinc (Method 200.8) if produced water was discharged during the quarter.
- IV. Non-contact Cooling / Fire Water / Hydrotest Water - Chlorine Monitoring:

If there is chlorination any time associated with either Non-contact cooling water, Fire water, or Hydrotest water that is discharged to the ocean, they each must be tested for Total Residual Chlorine (TRC) monthly for one year (per the RP schedule).

- Use the EPA 330.5 Spectrophotometer method. They should target 0.5 ppm).
- Record results on the chlorine report form and submit to ESH for final reporting.
- Note on the field report, the type of chlorination used (i.e. hypochlorite generator).

Part II - Sample Preservation: Sampling Procedures for the New General NPDES Permit - Produced Water:

1. General Sampling Requirements:

- Sampling shall be representative of the monitored activity.
- Samples shall be grab (i.e., discrete) samples.
- The analyses shall be conducted by a California certified laboratory.
- Records of each monitoring event shall include:

the date, exact place, and time of sampling,
the individual(s) who performed the sampling,
the date(s) analyses were performed,
the individual(s) who performed the analyses,
the analytical techniques or methods used,
the results of such analyses, and
the detection levels.

2. Facility Sample Locations:

All samples are to be collected downstream of the last treatment vessel and prior to ocean discharge. If there is another source of water (i.e. cooling water) mixed with the produced water, the produced water sample must be sampled prior to the commingling of the fluids.

3. General Sampling Procedures:

The following requirements relate to all samples being collected:

- a. Use new, "EPA Clean" sample containers from a State certified lab. The containers shall contain the appropriate preservatives and have waterproof label's. Alternatively, preservatives may be added onsite at the facility being sampled. This will be necessary for facilities reached by helicopter where preservation must be made at the facility.
- b. The duration of sampling for each sample shall be less than 15 minutes (i.e., grab samples or discrete samples).
- c. Use rubber gloves and safety goggles (not just glasses) while collecting samples. Remember, some of the empty sample containers contain hazardous preservatives (i.e., sulfuric acid, nitric acid, etc.) which are used to help preserve the samples during their holding times. These containers will be properly marked and labeled consistent with applicable DOT regulations.
- d. Prior to sampling, confirm with the lead operator that produced water is being discharged and that conditions are representative of the nature of the discharge.
- e. Prior to collecting a sample, purge the sample line using produced water for at least one to two minutes. For facilities with in-line sample coolers, allow two to three minutes of purging. It is important to be sure that all of the stagnant fluid is adequately purged and flushed from the line prior to collecting a sample.
- f. While the sample tubing is purging, neatly complete the label for the sample container(s) using a waterproof pen. On each label, include the company name, facility name, sample location, sample date, sample time, your name, the analysis required, and the preservation.
- g. After purging the sample tubing, reduce the flow through the sample point to a non-turbulent state and slowly fill the container, being careful not to insert the tip of the sample tubing into the containers. This will help preventing the preservatives from splashing out of the containers and it reduces the likelihood of any contamination from the sample tubing itself.

- h. Do not over fill sample containers (the two exceptions are the containers for volatile and semi-volatile organic compounds). Overflowing a container may flush out preservatives and any oily residue that may be present in the upper layer of the sample. For volatile and semi-volatile organics, fill the sample containers completely so that there is no head space.
- i. Place "custody seal" tape around the cap and top of the closed sample containers. This will guard against unauthorized sample tampering. If a sample is in a VOA vial, wrap the custody seal around the cap and bottle while avoiding contact between the tape and the septum.
- j. Hot samples collected in glass containers must be cooled before placing them on ice. Placing a hot sample directly on ice can crack the glass container. To start the cooling process, samples can be insulated from the ice with bubble packaging and placed in proximity to the ice rather than allowed to cool at room temperature.
- k. Always use proper packing (i.e bubble packing) with each separate sample to avoid breakage during transportation. This is very important since cooler are often dropped or handled improperly by transport personnel (cranes, boats, landings, etc.).
- l. Place the cooled sample containers in a cooler full of either blue ice or regular ice to achieve a storage temperature of 4 degrees C (39 degrees F). Do not store in a refrigerator that holds food for human consumption.
- m. Clearly and accurately complete a chain-of-custody for each sampling event using the attached example as a guide. A chain-of-custody must accompany the samples from the sample location, all the way to the lab. Each individual who takes control of the sample during transport must sign, date and time the chain-of-custody in the space provided. When a sample changes custody, both the relinquishing party and the receiving party must sign. Once signed off at the lab, retain a copy of the chain-of-custody for filing.

4. Constituent Sampling Procedures:

- a. Ammonia -
 - Sample Container: one quart, glass or plastic.
 - Preservation: add sulfuric acid (H_2SO_4) until the pH of the sample is less than two.
 - Cool to a temperature of 4 degrees C.
 - Holding Time: 28 days.
- b. Metals - (*Arsenic, Cadmium, Copper, Lead, Manganese, Mercury, Nickel, Selenium, Silver, Zinc, total chromium*)
 - Sample Container: two quarts, plastic.
 - Preservation: add nitric acid (HNO_3) until the pH of the sample is less than two.
 - Cool to a temperature of 4 degrees C.
 - Holding Time: six months (except mercury, which is 28 days).
- c. Hexavalent Chromium – Not required unless specifically asked for (total chrome can be done instead of hex chrome).
 - Sample Container: one quart, plastic.

- *Preservation: cool to a temperature of 4 degrees C.*
- *Holding Time: 24 hours.*

d. Cyanide -

- Sample Container: 500 to 1,000 milliliters, plastic/glass.
- Preservation: use lead acetate paper to check for the presence of sulfides in the sample. If sulfides are present, add cadmium nitrate powder to remove the sulfides, then add sodium hydroxide (NaOH) until the pH of the sample is greater than 12. If sulfides are not present, just add NaOH until the pH of the sample is greater than 12. Cool to a temperature of 4 degrees C.
- Holding Time: 24 hours if sample was only cooled. The holding time is 14 days if the sample has been fixed with cadmium nitrate and NaOH.

e. Volatile Organic Compounds - (Benzene, Toluene, Ethylbenzene)

- Sample Container: two 40 milliliter glass VOA vials with Teflon-lined septums.
- Preservation: cool to a temperature of 4 degrees C.
- Do not add HCl preservative due to high bicarbonate and CO₂ release. Instead seal with no head space, ice and on c-o-c instruct lab of the short hold time.
- Holding Time: seven days.

Special Handling Instructions: Fill each VOA vial slowly to the top until there is a positive meniscus. Then secure the cap so that no air bubbles are present in the vial (turn the sealed vial upside down to check for bubbles).

f. Semi-Volatile Organic Compounds - (Benzo (a) Anthracene, Benzo (a) Pyrene, Chrysene, Benzo (k) Fluoranthene, Benzo (b) Fluoranthene, Dibenzo (a,h) Anthracene, Naphthalene, 2,4-Dimethylphenol)

- Sample Container: one liter, glass with Teflon lined cap.
- Preservation: cool to a temperature of 4 degrees C.
- Holding Time: seven days.

Special Handling Instructions: Fill container completely so that there is no head space and make note for lab that the sample is not to be preserved with HCl.

g. Phenolic Compounds -

- Sample Container: 500 to 1,000 milliliters, glass with a Teflon lined cap.
- Preservation: add sulfuric acid (H₂SO₄) until the pH of the sample is less than two.
- Cool to a temperature of 4 degrees C.
- Holding Time: 28 days.

h. Oil and Grease -

- Sample Container: one liter, glass with Teflon lined cap.
- Preservation: add sulfuric acid (H₂SO₄) or hydrochloric acid (HCl) until the pH of the sample is less than two. Cool to a temperature of 4 degrees C.

- Holding Time: 28 days.

Please follow the above procedures precisely and call me at any time if you have any questions.

S.G. Lawry
Environmental and NPDES Compliance Specialist
LTS Environmental Inc. (805) 644-4560

Mydocs/PacEnergy/NPDESMonitoringSOP2007